

Technology and The New Economy

presented by

LIN KNAPP
Vice Chairman

September 22, 2000

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- **Opening Remarks**
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 - *The Impact of Wireless*
 - **The New Economy**
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Opening Remarks

*Technological advances and
business trends will make
Information Security Management and Assurance
an even greater challenge
than they are today.*

Information Security Management and Assurance: A Call to Action for Corporate Governance

“In striving to manage risk, it is essential to have a fundamental understanding of risk elements. It is also important to be aware of new threats and changes in technology that open new vulnerabilities in information security.”

Technology: *Technologies for 2000-2020*

***“Sometimes it seems as though
information technology simply must be
nearing the end of its upward journey
along the S-curve...”***

Technologies for 2000-2020

... Surely, the curve has to flatten out soon and let us all get our bearings.

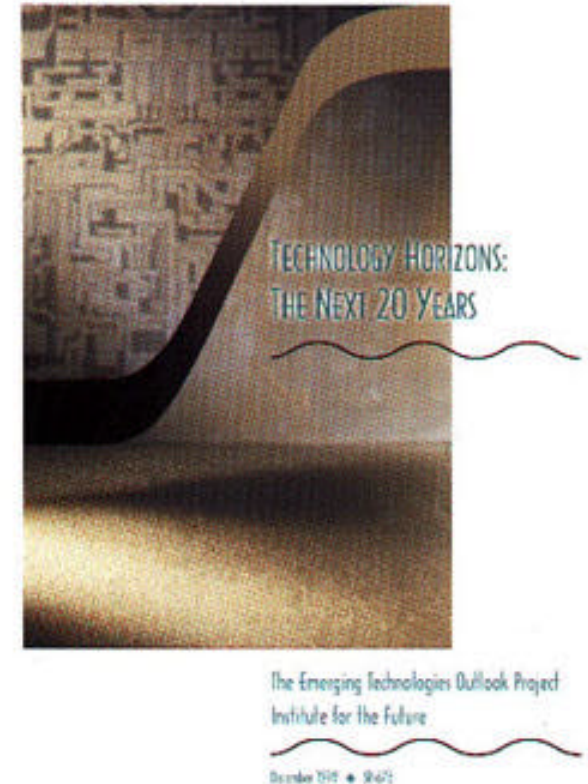
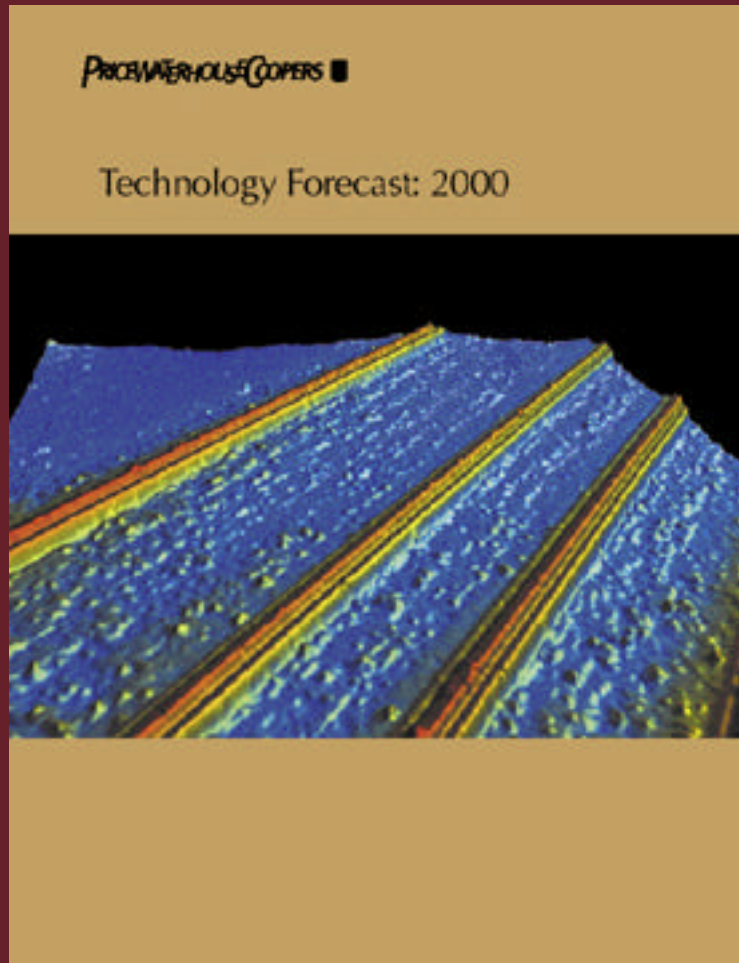
Surely, we'll have a chance to figure out how it's all done in this brave new world of e-commerce and e-community.

Surely, we'll actually get to practice our various new trades with a sense of competence for a while...

... Well, probably not.

*At least not if you take the view of the
technology experts.”*

Technologies for 2000-2020

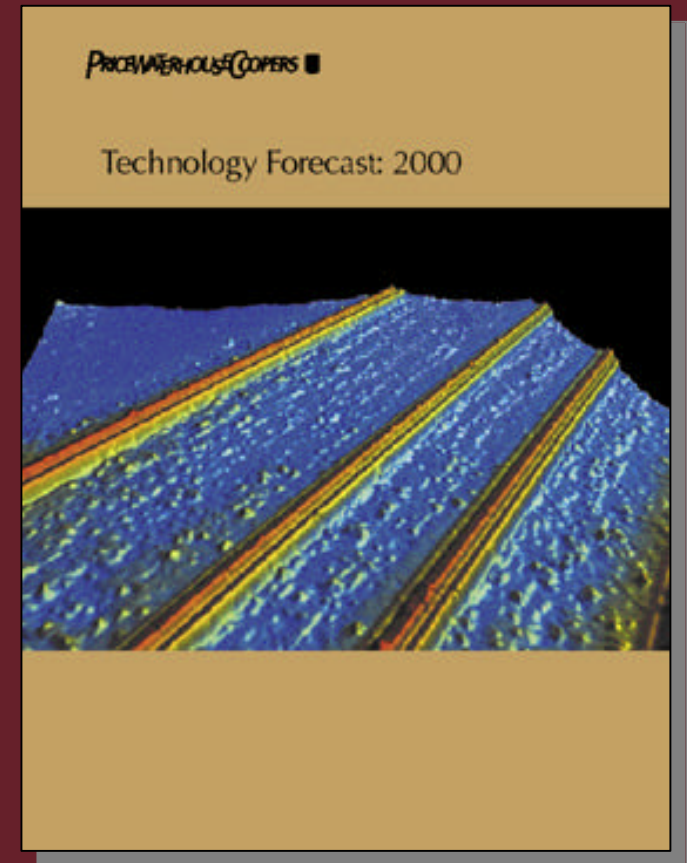


PLUS

The Gartner Group, Forrester Research,
The Meta Group, IDC
and others

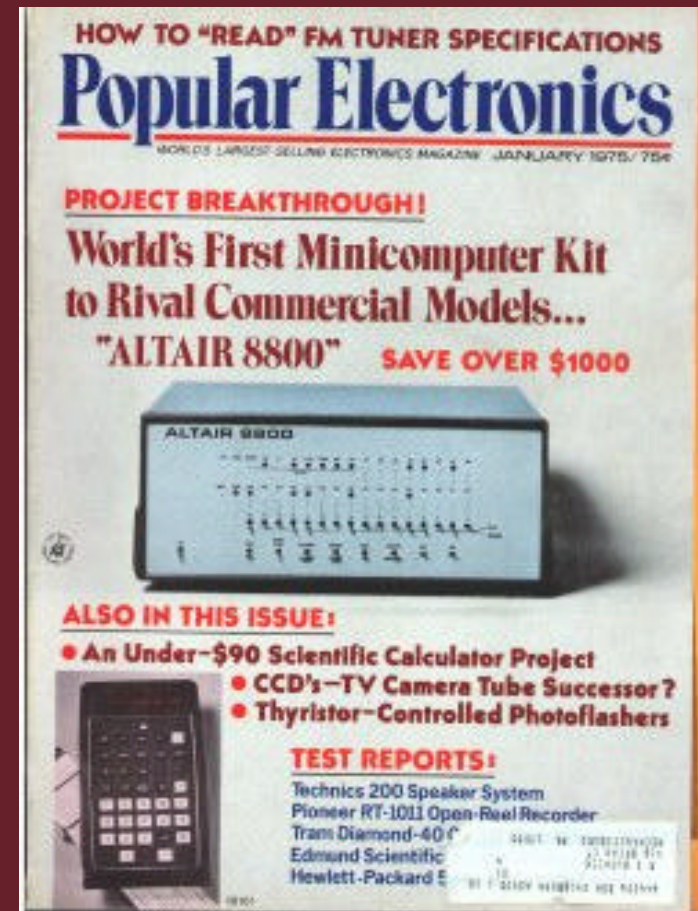
Technologies for 2000-2020

- **Emerging Platforms:**
mobile/wireless, consumer
Internet access, smart devices
- **Key enabling technologies like**
XML, XHTML, WAP and Bluetooth
- **Embedded web servers**
- **Webtops**



Technologies for 2000-2020

- Hard to get much more convergence, given that the classic PC has a 95+% market share.
- So its almost inevitable that there will be greater diversity among client platforms.



Technologies for 2000-2020

Emerging Platforms

“When you consider the number of pockets out in the world, the PC market looks puny”



Bill Joy, Sun Microsystems



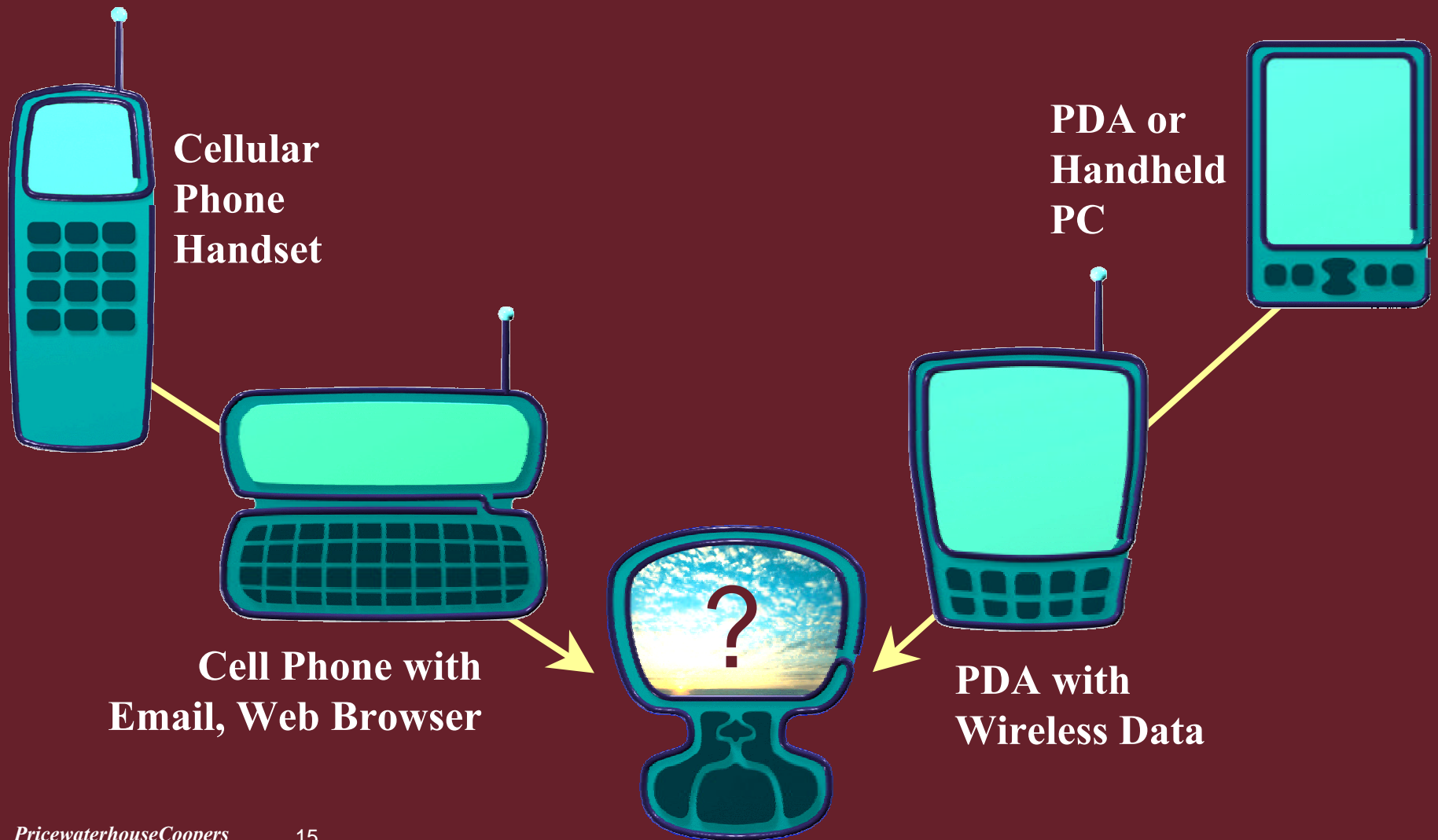
Technologies for 2000-2020

Traditional Computing Platforms Explode Into a Variety of New Devices



Technologies for 2000-2020

Cell Phone Handsets and Handheld Computers Overlap in Function



Technologies for 2000-2020

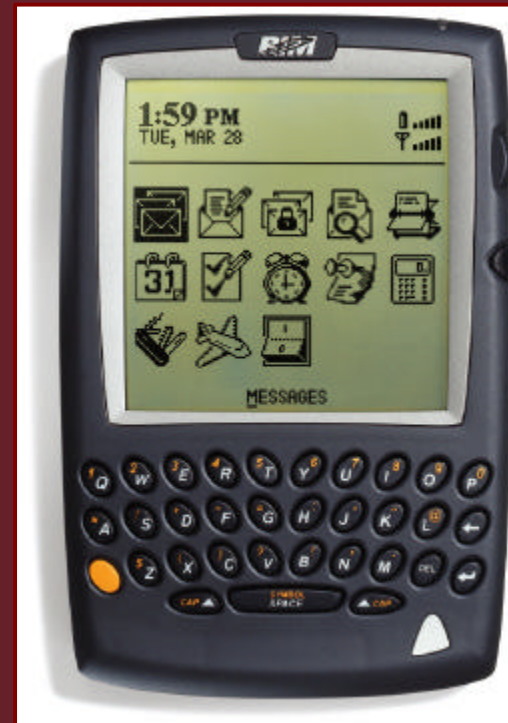
Emerging Platforms

NTT DoCoMo I-Mode Phone



Source: NTT

Wireless E-Mail Devices: Blackberry



Source: Research in Motion

Technologies for 2000-2020

Key Enabling Technologies

- **XML** — Enables trading partners to easily transact across dissimilar applications, systems, software and documents; could change the communications landscape for business.
- **XHTML** — A bridge to the Web of the future. The Web is moving from HTML to XML; XHTML connects the present Web to the Future Web.
- **WAP and Microbrowsers** — Enable mobile phones to access the Internet.

Key Enabling Technologies: Bluetooth

“A specification for short-range wireless communication between notebook PCs, handheld computers, mobile phones, wearable devices, digital cameras, home appliances....”

Key Enabling Technologies: Bluetooth

- **Specification is a product of the Bluetooth SIG, launched in 1998: Ericsson, IBM, Intel, Nokia, Toshiba. Now over 1000 companies are members, including Microsoft.** *Source: Upside, "A Wireless Way of Life" June 2000, by John Edwards*
- **Forecast is 670 million in Bluetooth-enabled devices and sales of over \$2 billion by 2005.** *Source: Cahners In-Stat Group*
- **In mid-June, 2000 delegates attended the Bluetooth Congress in Monte Carlo.** *Source: BBC News, 13 June 2000*

Technologies for 2000-2020

Embedded Web Servers

Think of any device that has embedded computing functions — printers, sensors, automated manufacturing devices.

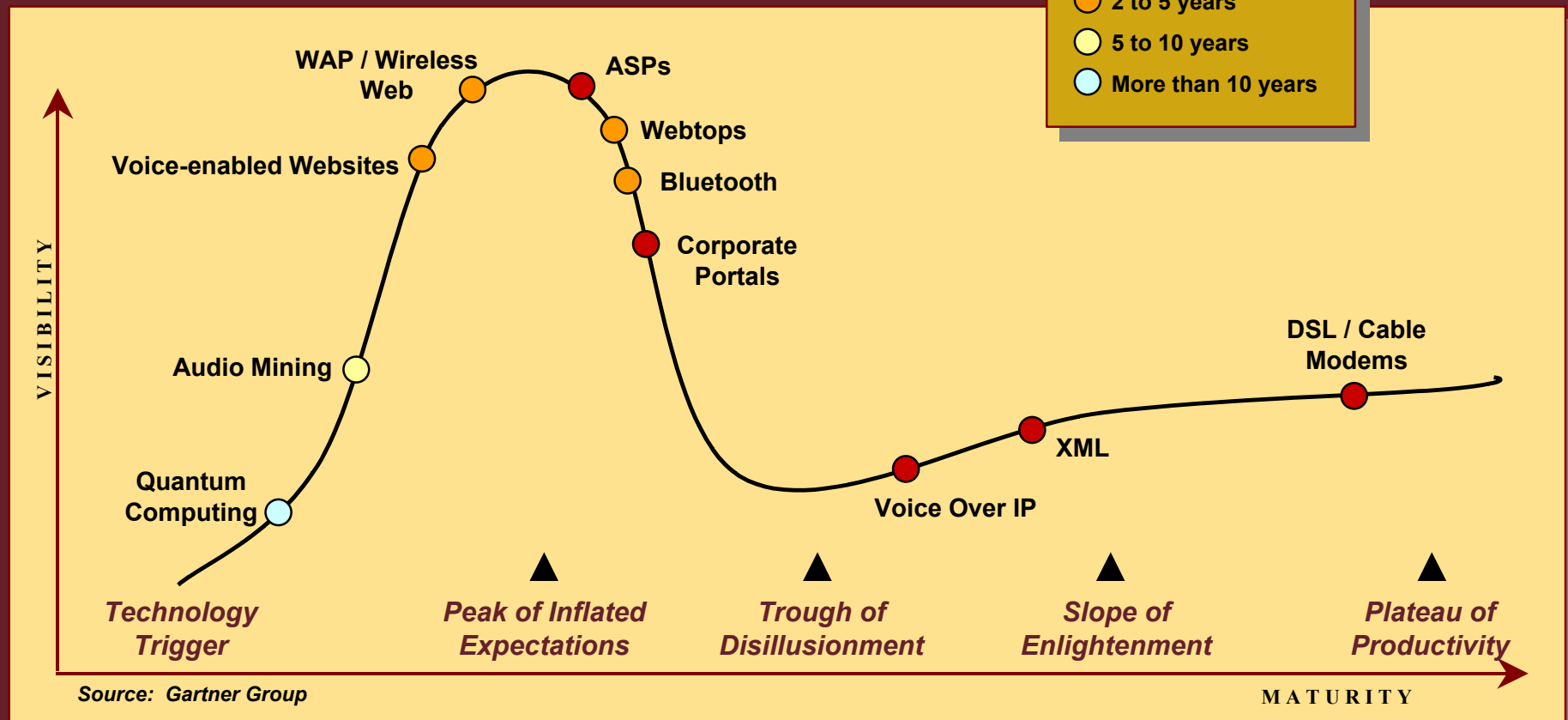
**Then imagine you can control these devices via the Internet.
*These are embedded web servers.***

Webtops . . .

Webtops are Web-based personal portals — virtual desktops resident on the network — that give users access to their information and applications from wherever they gain access to the Internet.

Technologies for 2000-2020

Riding the Hype Cycle



Technology: *The Impact of Wireless*

The Impact of Wireless

World Economic Forum
Annual Meeting 2000, Davos, Switzerland



Panel Session: Wireless Means More

“We are witnessing the migration of the Internet from the PC to wireless handheld devices.”

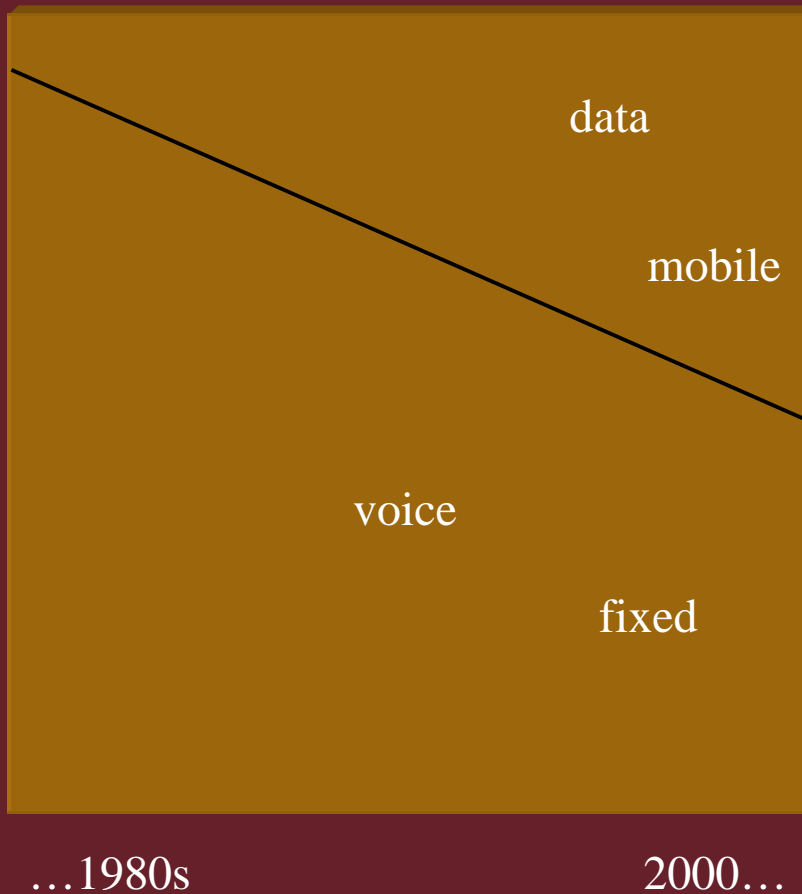
William E. Kennard, Chairman, FCC, USA

“The wireless world is a world of constant connectedness.”

Charles M. Parrish, EVP, Phone.com, USA

The Impact of Wireless

Wireline Doesn't Disappear, Rather Decreases in Proportion to the Total



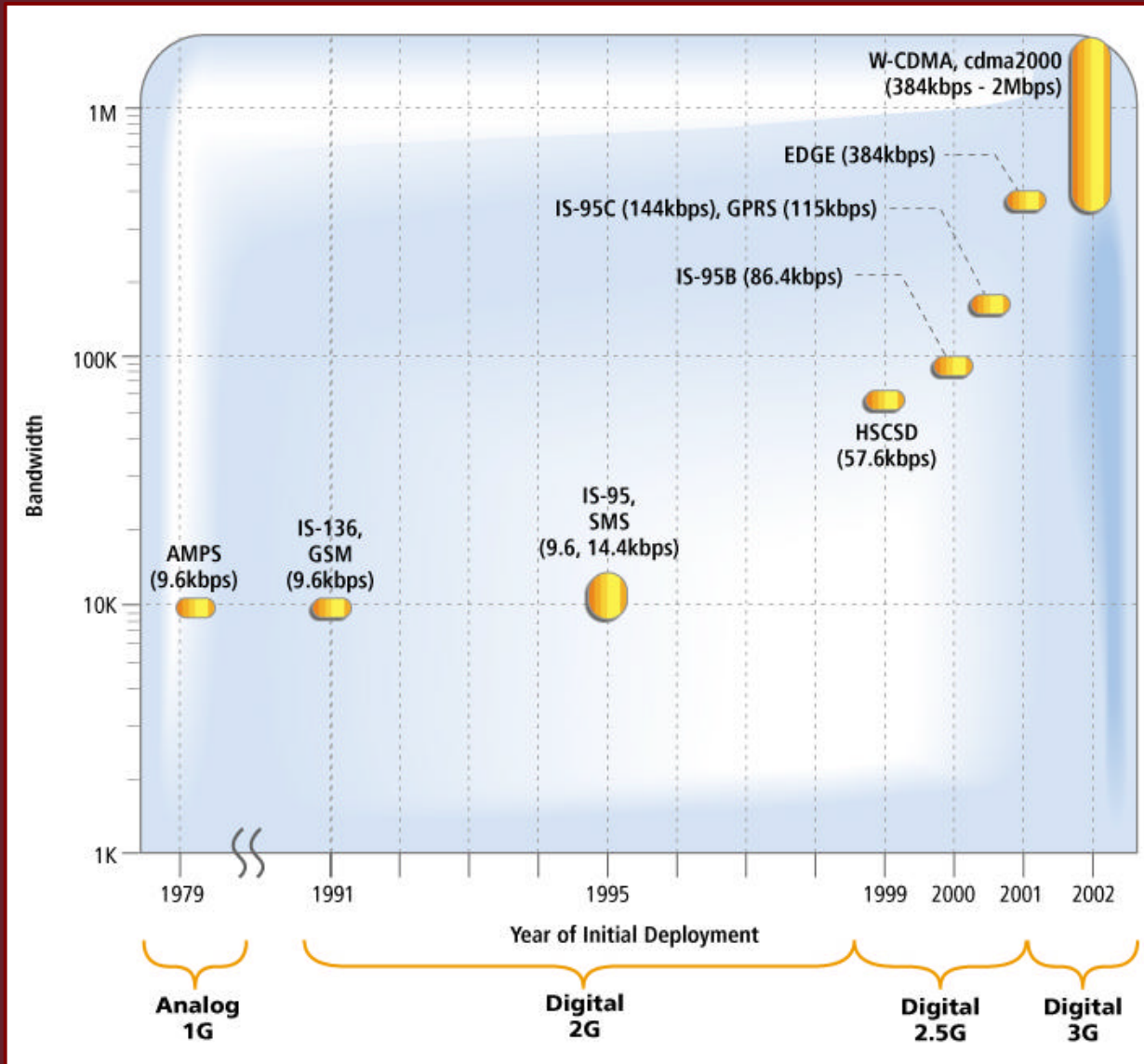
Trends in Basic Infrastructure

voice:data from 80:20 to 20:80

fixed:wireless from 90:10 to 40:60

The Impact of Wireless

Faster Wireless Data Rates via 2.5G and 3G Cellular Systems



Origin of the Mobile Species

“CMDA, UMTS, WAP, GPRS, EDGE, GSM – Dan Roberts explains the rapid march of wireless technology.”

Source: Financial Times, July 14, 2000

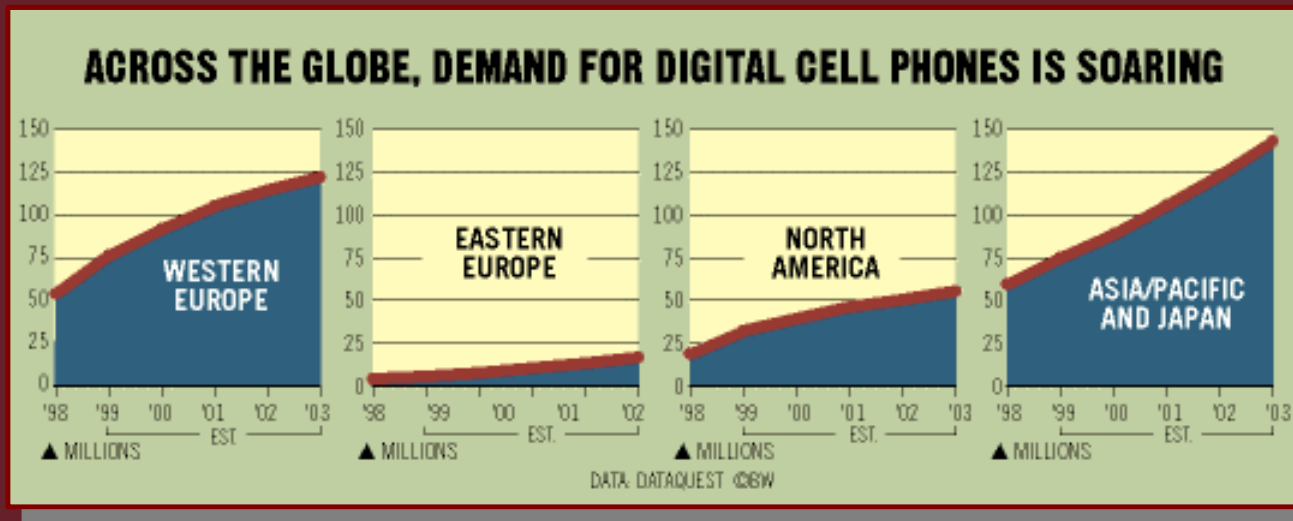
The Impact of Wireless

Digital 3G Service

- **NTT DoCoMo** was the first company to apply for permission to begin operation of 3G service; commercial operation of their 3G wireless network will debut next May.
- **Sprint PCS** says it will introduce 3G service in the US in late 2001.
- **Vodafone** will introduce 3G service in Britain in early 2002.

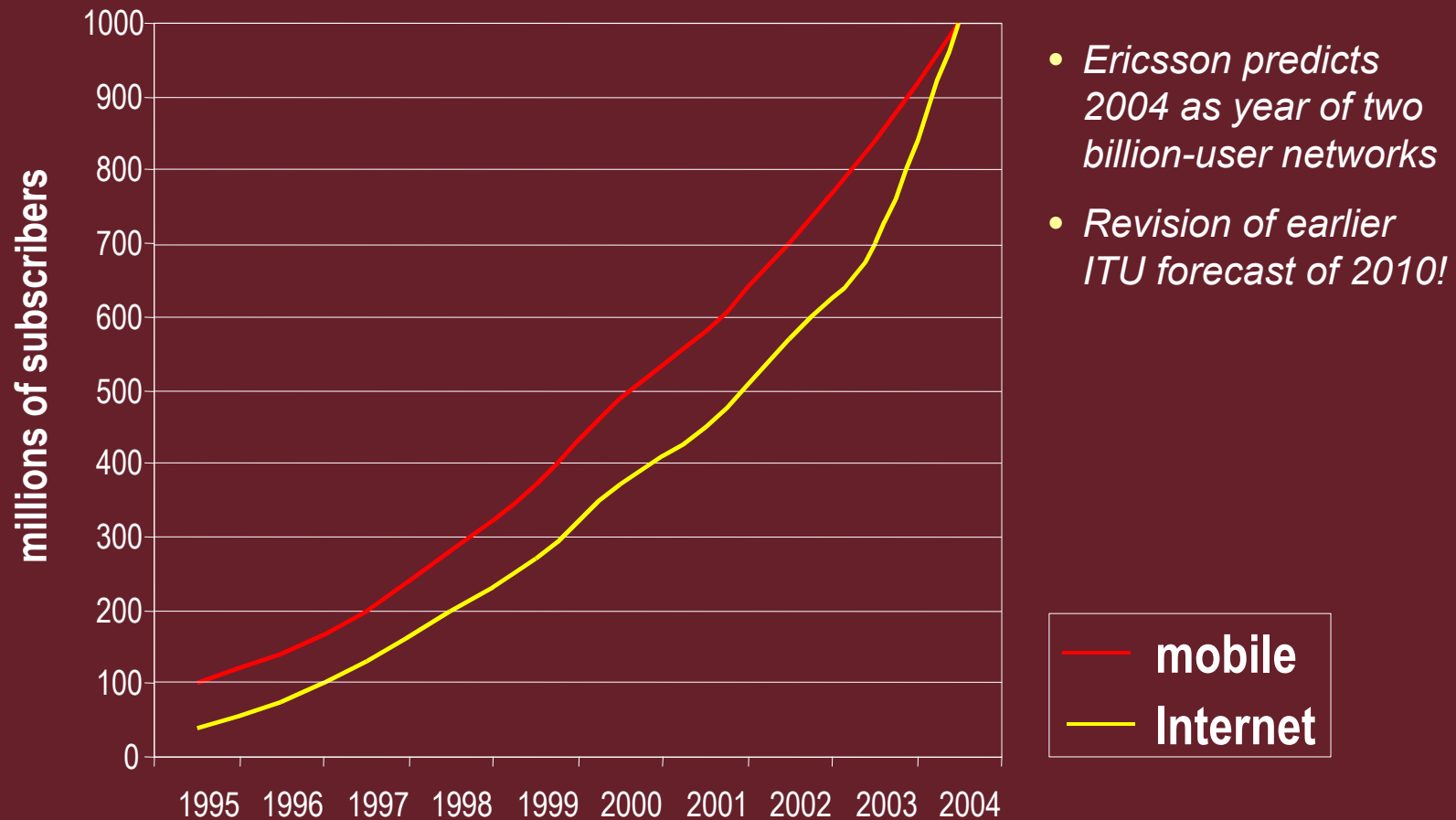
The Impact of Wireless

Across the Globe, Demand for Digital Cell Phones is Soaring



The Impact of Wireless

Parallel Growth of Mobile and the Internet



The Impact of Wireless

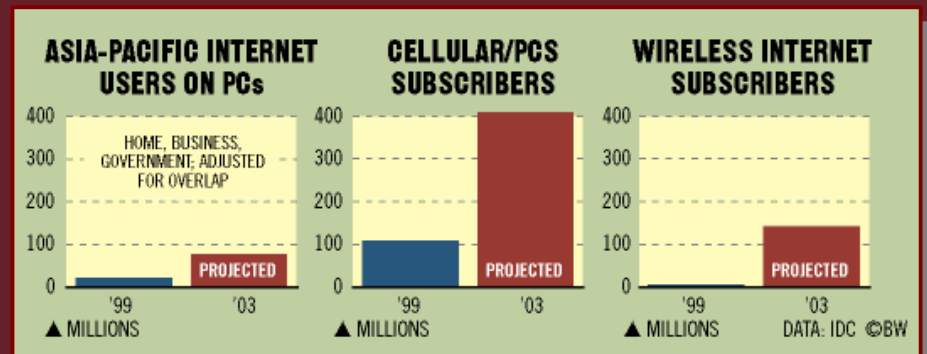
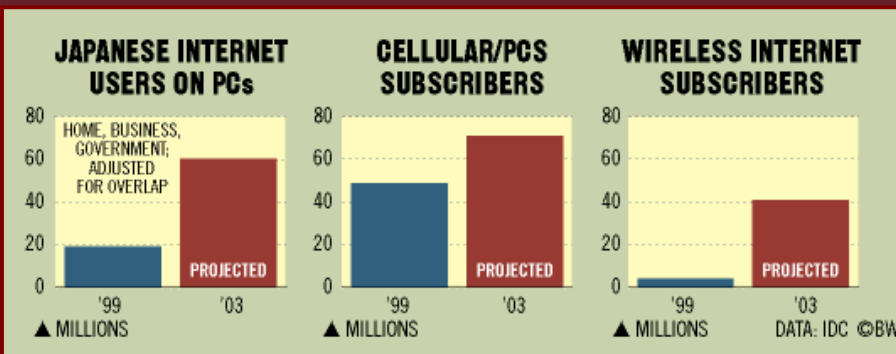
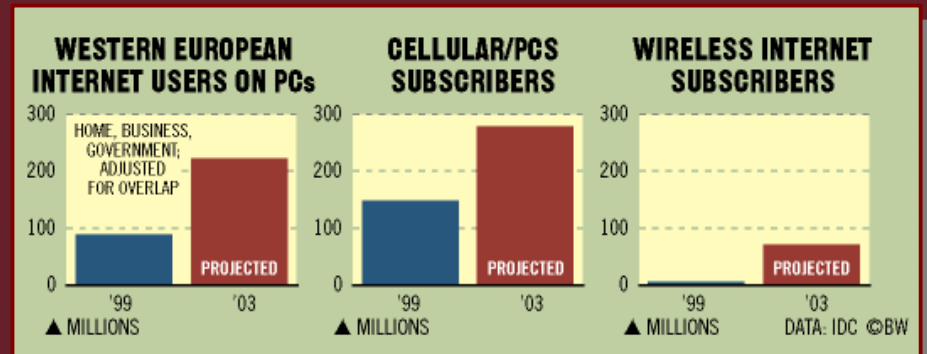
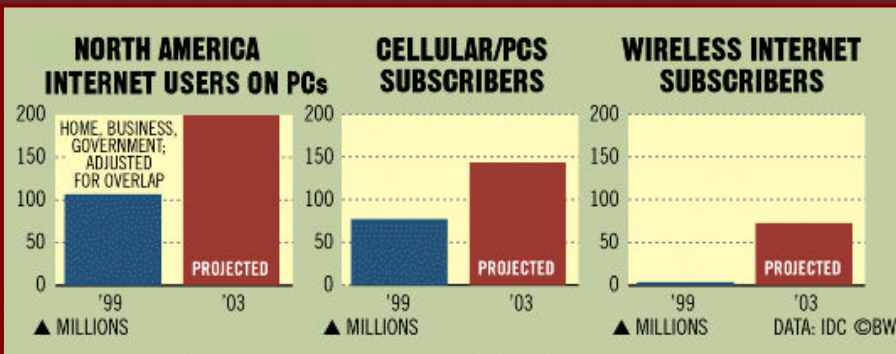
Wireless Web Access

By 2005, experts say 97% of wireless phones will include Web access, up from 7.5% today

Year	Mobile Phones In USA¹	Phones With Web Access¹
2000	103.3	8.2
2001	119.8	29.4
2002	135.9	69.6
2003	150.2	120.1
2004	163.8	152.4
2005	176.9	171.1
Source: Forrester Research ¹ – in millions		

The Impact of Wireless

As Cellular/PCS Use Increases, So Will Wireless Internet Access, Especially in Asia-Pacific



The Impact of Wireless

The Phenomenon of NTT DoCoMo, Inc.

- **i-mode phone** introduced 18 months ago.
- **AOL** took more than 10 years to reach 20 million subscribers; NTT DoCoMo expects to reach that in less than two years for wireless internet subscribers.
- **CNN** plans to announce today that it has struck a deal for NTT DoCoMo to provide news and other information to customers over their mobile phone handsets.

THE SKY'S THE LIMIT

With access to the Web, your little cell phone can do everything from book airline flights to send e-mail — if you've got the time

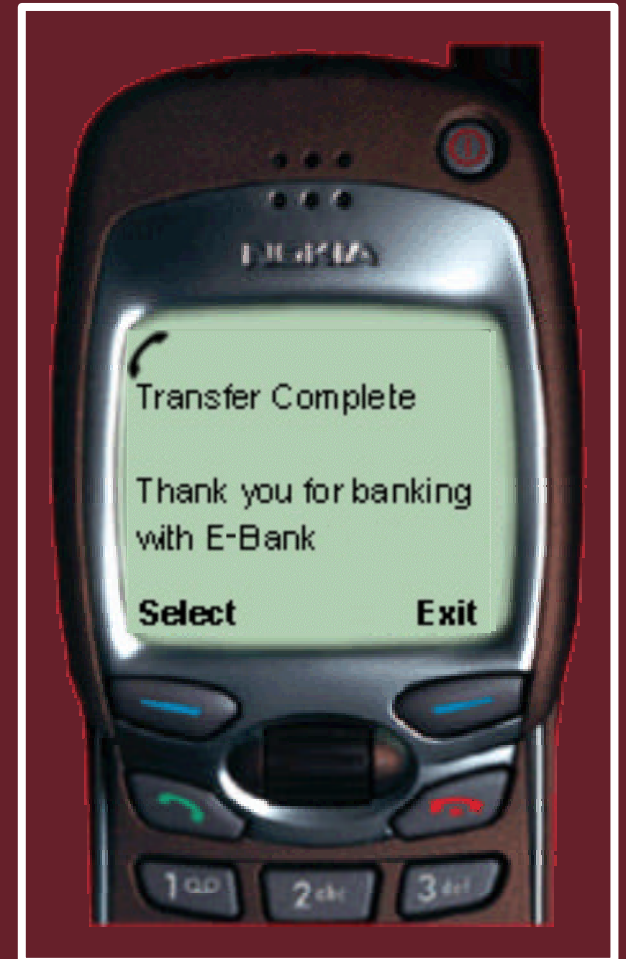
BY ALAN COHEN

- check e-mail
 - look up appointments
 - read news
 - keep tabs on stock portfolios
 - check status of airplane flights
 - get the weather report
 - access address books
 - check stock prices
- *and m-commerce*

The Impact of Wireless

Mobile Commerce

- **Scroll through menu:**
 - Select *Services*
 - Select *Favourites*
 - Select *Banking*
- **Authentication**
- **Banking options:**
- **Select Money Transfer**
- Enter:**
 - Amount of money to transfer
 - Account number that money is coming from
 - Account number that money is going to
- **Confirmation Message appears**



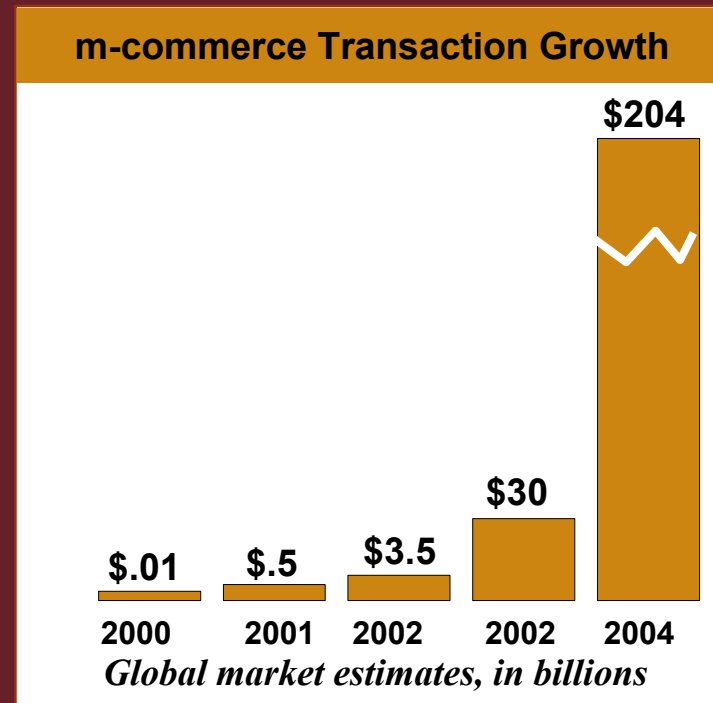
“The wireless web market is in its infancy... in five years nearly all mobile phones will have web access... By then, the mobile commerce market should hit \$25 billion a year, Merrill Lynch says.”

*Source: “Net, Wireless Titans Gird for Battle,”
USA Today, August 17, 2000*

The Impact of Wireless

“We’re currently in the eye of a hurricane with mobile commerce.”

“New applications are being announced daily. Buy.com just announced a wireless feature that enables Palm VII users to shop the web superstore from virtually anywhere.”



Source: Strategy Analytics

“The explosive potential of m-commerce extends into B2B. IBM just announced that it’s developing a line of software that will enable exchanges and auctions to take orders from hand-held devices.”

The Impact of Wireless

Evolution of Webs on Top of the Internet



- Today's version (the *sit-up web*)
- An information web delivered through mobiles and pocket communicators (the *phone web*)
- An entertainment web
- A voice-activated web (*for appliances, etc*)
- A computer-to-computer web for e-business
- A pervasive computing web for networking wherever there are electronic devices

“The first web has so far created most of the wealth. So the potential of the other five is immense.”

*William N. Joy, Founder and Chief Scientist, Sun Microsystems
Comments from the World Economic Forum Annual Meeting 2000
Panel Session: The World Joins the Worldwide Web*

The New Economy

“Everything that was comfortable about business is changing. The networked economy will be the most important force shaping the next decade, and will change the world’s societies, culture, and politics.”

James Daly, Editor-and-Chief, Business 2.0 Magazine, June 13, 2000

“But first it will radically transform businesses, altering the way they reach their customers, advertise their wares, distribute their products, create new businesses, and communicate with one another and their staffs.”

James Daly, Editor-and-Chief, Business 2.0 Magazine, June 13, 2000

The New Economy

Some Things You Probably Know. . .

- **The hallmarks of the New Economy are B2C and B2B commerce; B2B will generate 5 to 7 times more economic value than B2C.**
- **North America accounted for 63% of the estimated worldwide \$145 billion in B2B commerce in 1999.**
- **In 2004 B2B e-commerce is projected to surpass \$7.29 trillion; but the North American region's share will account for only 39%.**

Source: Gartner Group

The New Economy

Some Things You Probably Know. . .

- **In the New Economy, competition is a network affair — markets are conversations, and multiple vendors participate in these conversations, side-by-side with competitors.**

Source: IFTF

- **Gartner predicts that, by 2005, more than 500,000 companies will participate in marketplaces as buyers, sellers or both.**

Source: eCommerce Business, August 28, 2000

The New Economy

“Merrill Lynch estimates total worldwide B2B e-commerce sales in 2003 will be \$2.5 trillion, and about 20% of that (\$500 billion) will be captured by Web marketplaces, which may generate earnings close to \$25 billion a year.”



*Source: eCompany.com, June 2000,
Corporations of the World Unite!, by Erick Schonfeld*

The New Economy

“Why B2B Is a Scary Place to Be”

- The competitive forces that have ripped through the B2C market are now wending their way through one of the web’s supposedly unassailable segments: the B2B exchange market.
- The typical B2B stock is down by 70% to 90%.
- Too many B2B exchanges are chasing too few dollars.

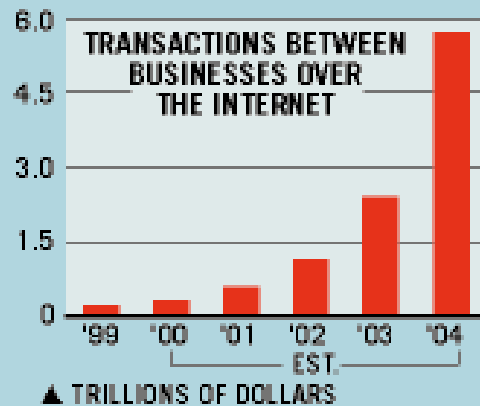


Source: *BusinessWeek*, September 11, 2000

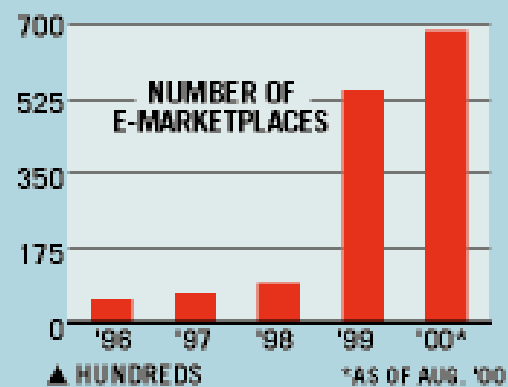
The New Economy

“Why B2B Is a Scary Place to Be”

DESPITE SOARING B2B SALES...



...TOO MANY RIVAL E-MARKETPLACES...



Data: AMR Research, Inc., Bloomberg Financial Markets, BusinessWeek

“Why B2B Is a Scary Place to Be”

“The long term prospects are still enormous. B2B e-commerce could reach \$5.7 trillion by the end of 2004, and fully half of that will flow through exchanges.”



The New Economy

Next Generation e-Markets

“One pared-down form of e-marketplace on the horizon is the private trading network (PTN).”

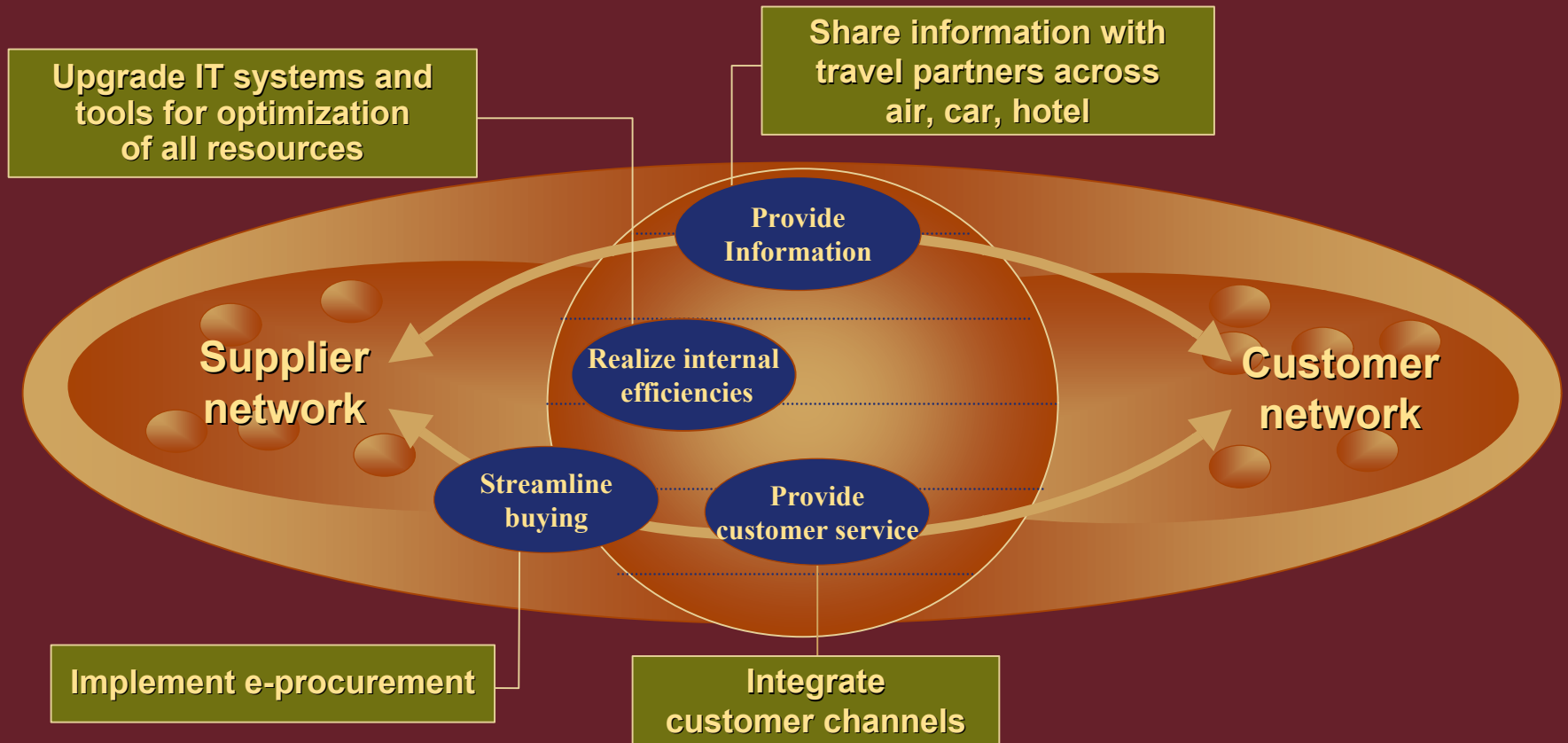
Also known as:

- Private procurement
- Private marketplace
- Private buying exchange
- Butterfly

“PTNs place a company in the middle, connected with its suppliers on one side and its customers on the other.”

The New Economy

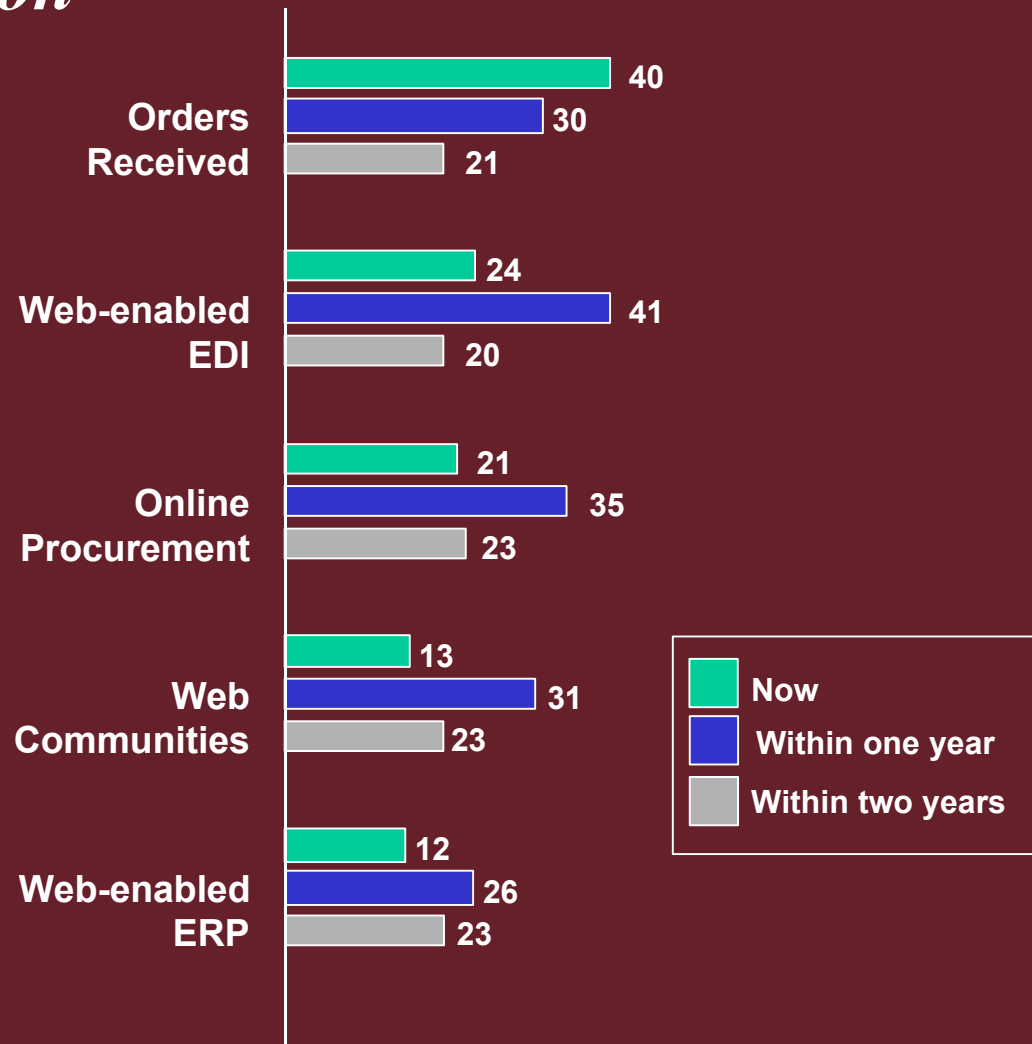
Value Chain Integration



The New Economy

Value Chain Integration

When do you expect to employ the following e-business capabilities in your organization?



Source: *Electronic Business Outlook, Survey 2000* prepared by The Conference Board, Inc. in conjunction with PricewaterhouseCoopers

The New Economy

How Important is E-Business in the New Economy?

“You have to be in e-commerce in every element of your business, in all of your supply chain, in all of your information flow, in all of your communications, in all of your customer interactions. This is not some activity outside the business — this is the business ...

It’s like breathing when you come to work! You have to breathe all day to stay at your desk, don’t you?”

Jack Welch, CEO of General Electric

*Source: eCompany.com, June 2000, “Corporations of the World Unite!
You Have Nothing to Lose but Your Supply Chains”,
by Erick Schonfeld*

Hazards and Uncertainties

Hazards and Uncertainties



“No brick-and-mortar store would think of opening their doors without installing locks, a few video cameras, and a security staff. Yet every day Internet companies do just that.”

Lou Gerstner, Chairman and CEO, IBM

Source: Business 2.0, June 13, 2000

Hazards

- Legal or regulatory exposure
- Misuse of private customer information
- Inadvertently creating a taxation presence
- Security penetration, eavesdropping, impersonation, fraud
- Operational failure

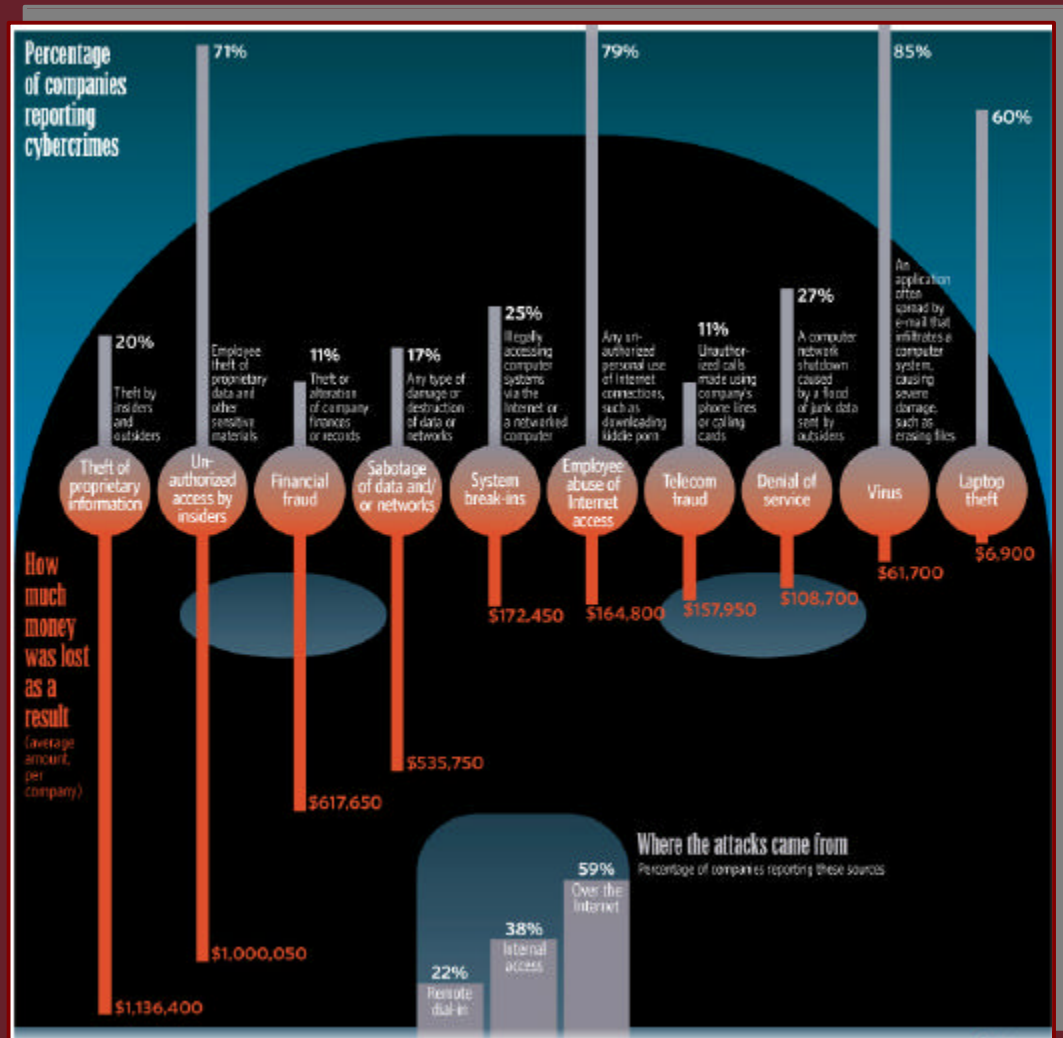
*Source: “Enterprise Risk Management: Harnessing the Power of Risk for e-Business,”
By Dave Erickson, GRMS, PricewaterhouseCoopers*

Hazards and Uncertainties

Unmasking Cybercrime

A survey of corporate espionage, fraud, and bad behavior.

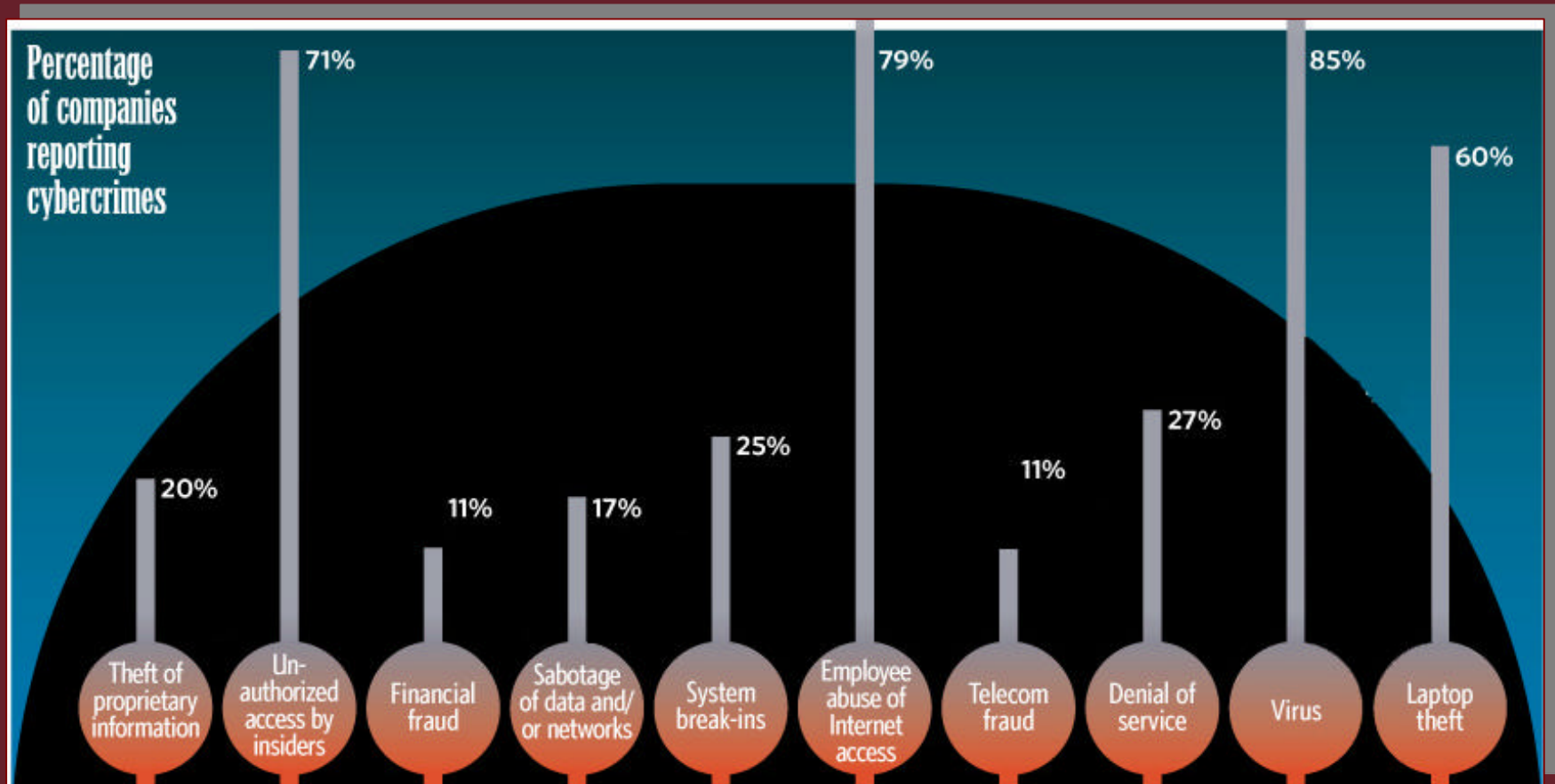
A survey of 643 U.S. organizations by the Computer Security Institute and the FBI



Hazards and Uncertainties

Unmasking Cybercrime

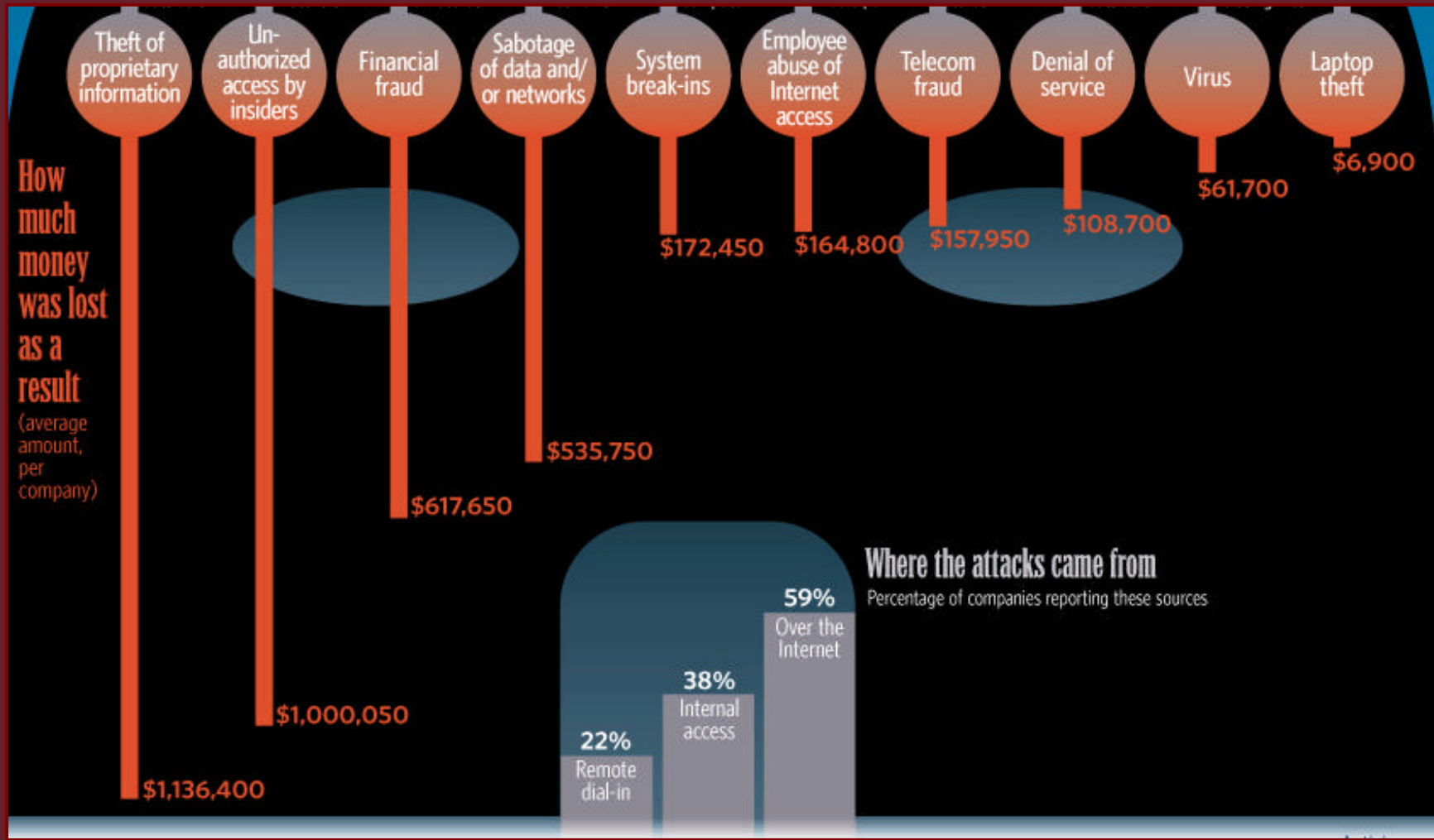
A survey of corporate espionage, fraud, and bad behavior.



Hazards and Uncertainties

Unmasking Cybercrime

A survey of corporate espionage, fraud, and bad behavior.



Hazards and Uncertainties

Next e-Security Threat: Mobile Phones

“Security experts contend that mobile phones will soon replace PCs as the conduit of choice for hackers.

WAP, which enables mobile phone users to access the Internet, and 3G, which provides high-speed access to on-line servers, will both facilitate hacking.”

Source: Reuters, May 15, 2000

Hazards and Uncertainties

Next e-Security Threat: Mobile Phones

June 6, 2000 4:38 PM PT

Got a bug in your ear?

New worm outbreak spams cell phones in Spain. The message to virus fighters: **Trouble in any language.**

A new virus author has decided to reach out and touch cell phone users.

On Tuesday, anti-virus firms announced that the first text-paging worm had started spamming users of the cell phone company Telefonica.

The firms doubted that the Timfonica worm would spread far, but the latest outbreak underscored the message that viruses and worms pose a danger to more than just PCs.

“Timfonica does not infect your cell phone, but somewhere down the line we will see viruses that do.”

Hazards and Uncertainties

New e-Security Threat: Palm Devices

“A virus like program has infected some Palm devices, marking the first time the popular handheld computers have been hit by malicious software and raising the specter of future incidents.”

“‘This is the beginning of the handheld virus era,’ says David Perry of computer security firm Trend Micro.”

Is That A Virus In Your Hand?

The Liberty Crack bug that hit Palm Pilots gives a hint of how vulnerable the wireless Net is to vandals.

- The episode turned into a troubling glimpse at the future of viruses on handheld devices.
- It serves as stark notice of the problems waiting in a wired future where handhelds will vastly outnumber desktop PCs.

*Source: Business Week, September 25, 2000
"Computer Security," by Ales Salkever*

Is That A Virus In Your Hand?

*“As the Web expands its wireless reach,
‘Each node on the network not only
increases value and utility but also
exponentially increases vulnerability,’
says Srivats Sampath, CEO, McAfee.com”*

“It took the Melissa virus and last February’s storm of attacks to convince business — competitors even — that when it comes to Internet security, they are all just feathers on the same sitting duck.”

Cyberagents on Patrol

“If Steve Goldsmith of Sandia National Labs gets his way, one day every computer on the Internet will be part of a massive, cooperative security force.”

Hazards and Uncertainties

Nothing fails like success. Companies that cannot recognize changes in the business environment and react quickly will end up as road kill on the highway to the bottom line. That's the Possum Effect.

Tim Koogle, Chairman and CEO, Yahoo!, World Economic Forum, Annual Meeting 2000, Panel: Beyond the Possum Effect



Uncertainties

- Reputation, brand and shareholder value management
- Inspiring consumer confidence
- Attracting and retaining advertising revenue
- Managing change process and project risk

Source: "Enterprise Risk Management: Harnessing the Power of Risk for e-Business," by Dave Erickson, GRMS, PricewaterhouseCoopers

Hazards and Uncertainties

A Bumpy Ride



Hazards and Uncertainties

A Bumpy Ride



Hazards and Uncertainties

...And Speaking of Nasdaq



*“My stockbroker, Dot-Commupance,
reminds me that the difference between Nascar
and Nasdaq is that the former has brakes.”*

San Francisco Chronicle columnist Scott Ostler
finds a difference between two worlds where
whiplash and wipeouts are a way of life.

Hazards and Uncertainties

Of Particular Concern: Reputational Risk

10 Multibillion-dollar Corporations Hit the Net...



**Five
Get It!**

**Five
Don't!**



Hazards and Uncertainties



Five **Get It!**

Five **Don't!**



*“When it comes to handicapping corporate attempts at Internet strategies, the euphemism du jour is **‘getting it.’** PR machines tout a client’s vision by claiming ‘They Get it.’ Analysts refer to flawed visions by stating **‘They just don’t get it.’** While not the most quantitative measure of a New Economy business plan (or lack thereof), the phrase has become a benchmark.*

*So what does it take to ‘get it’? For **‘multibillion-dollar’** corporations, ‘it’ means much more than a domain name and a funny commercial.”*

Hazards and Uncertainties

E-Business is going to happen. It will bring business transformation, which translates into operational, process, application and technology change. Associated with these changes are:

- Hazards — change will allow undesirable things to happen
- Uncertainties — not meeting expected outcomes
- Opportunities — exploiting an opportunity to deliver value



Opportunities

- Building customer loyalty
- Optimising business processes and controls
- Creating new revenue streams
- Minimising taxation liability

Source: “Enterprise Risk Management: Harnessing the Power of Risk for e-Business,” by Dave Erickson, GRMS, PricewaterhouseCoopers

Closing Remarks

Closing Remarks

One Final Look Into the Future...

“We’re halfway through the information economy, and from start to finish it will last 75 to 80 years, ending in the late 2020s.”

*“The pervasiveness of the Internet
will only increase...”*

“...the issue of security should be, is, and will continue to be of paramount importance to business, investors, government and the public at large.”

“With your business ever more dependent on safe use of e-mail, the Internet, the Web, or other networked communications...”

...security savvy has become as important as understanding marketing or finance.”

*Source: “The Secrets & Lies of Cyber-Security” by Stephen H. Wildstrom
Business Week, September 18, 2000*



Last year, computer hackers
cost businesses 45 billion dollars.

THIS IS JUST A WARM-UP

PRICEWATERHOUSECOOPERS 

PRICEWATERHOUSECOOPERS 